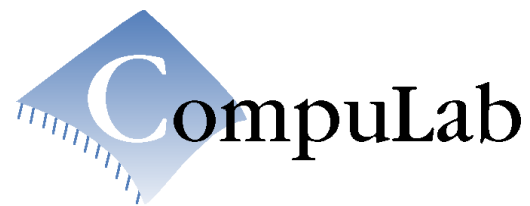


SB-xAM Evaluation Platform

Reference Guide

August 31, 2010



© 2010 CompuLab Ltd.

All Rights Reserved. No part of this document may be photocopied, reproduced, stored in a retrieval system, or transmitted, in any form or by any means whether, electronic, mechanical, or otherwise without the prior written permission of CompuLab Ltd.

No warranty of accuracy is given concerning the contents of the information contained in this publication. To the extent permitted by law, no liability (including liability to any person by reason of negligence) will be accepted by CompuLab Ltd., its subsidiaries or employees for any direct or indirect loss or damage caused by omissions from or inaccuracies in this document.

CompuLab Ltd. reserves the right to change details in this publication without notice.

Product and company names herein may be the trademarks of their respective owners.

CompuLab Ltd.
P.O.B. 66 Neshar
36770 ISRAEL
Tel: +972 (4) 8290100
Fax: +972 (4) 8325251
<http://www.compulab.co.il/>

Revision Information

Date	Description
Aug 31, 2010	Initial release

Please check for a newer revision of this manual in CompuLab's web site – <http://www.compulab.co.il/>. Compare the revision notes of the updated manual from the web site with those of the printed or electronic form version you have.

Table of Contents

1	INTRODUCTION.....	8
1.1	About This Document.....	8
2	OVERVIEW.....	9
2.1	Block Diagram.....	9
2.2	SB-xAM Features.....	9
2.3	SB-xAM Part Number Legend.....	11
3	INTERFACES AND CONTROLS.....	12
3.1	Components Locations.....	12
3.2	Components Listing.....	13
3.3	Signal type definition.....	14
3.4	Interfaces and Controls Description.....	14
3.4.1	DS1, LVDS Power Enable Indicator.....	14
3.4.2	DS2, +V3.3SBY Indicator.....	14
3.4.3	DS5, SATA Activity Indicator.....	14
3.4.4	DS6, +V5 Indicator.....	14
3.4.5	DS7, +V3.3 Indicator.....	14
3.4.6	DS8, PATA Activity Indicator.....	15
3.4.7	DS9, WLAN 1 Activity Indicator.....	15
3.4.8	DS10, WLAN 2 Activity Indicator.....	15
3.4.9	DS11, +V5SBY Indicator.....	15
3.4.10	E2, USB Supply.....	15
3.4.11	E3, PCI Slot VIO.....	15
3.4.12	J1, CMOS and RTC Reset.....	15
3.4.13	J2, 12V DC Power Input.....	15
3.4.14	P1 and P2, COM Express Module Connectors.....	16
3.4.15	P3, Line Input 2.....	16
3.4.16	P4, Line Output 2.....	16
3.4.17	P5A, CRT Output.....	17
3.4.18	P5B, Serial Port.....	17
3.4.19	P6A and P7A, LAN Interfaces.....	17
3.4.20	P6B and P7B, USB Interfaces.....	18
3.4.21	P8, SATA Interface.....	18
3.4.22	P9, LVDS Interface.....	18
3.4.23	P11, Parallel LCD (24 bit).....	19
3.4.24	P12, Parallel LCD (18 bit).....	20
3.4.25	P13, PCI Express slot.....	21
3.4.26	P15, PCI slot.....	21
3.4.27	P16, SDVO/HDA Extension.....	22
3.4.28	P17, PCI M66EN.....	24
3.4.29	P19, +V5 Current Measurement.....	24

3.4.30	P21, +V3.3 Current Measurement.....	24
3.4.31	P24, +V5SBY Current Measurement	24
3.4.32	P25, IDE Interface	24
3.4.33	P26, Auxiliary Signals	25
3.4.34	P27, S/PDIF (Coaxial)	26
3.4.35	P28, 5.1 Front Output	26
3.4.36	P29, Line Input 1	27
3.4.37	P30, Center/LFE Output	27
3.4.38	P31, Surround Output	27
3.4.39	P32, Microphone Input 1	27
3.4.40	P33, LVDS Interface (FPC).....	28
3.4.41	P34 and P35, PCIE Mini	28
3.4.42	SW1, Reset Button	30
3.4.43	SW2, Power Button	30
3.4.44	U1 and U2, USB4, USB5, USB6 and USB7	30
3.4.45	U14, S/PDIF Optical.....	30
4	FUNCTIONS IMPLEMENTED ON THE SB-XAM.....	31
4.1	Audio Codec.....	31
4.2	LCD Power Switch.....	31
4.3	Parallel RGB	31
4.4	Analog RGB.....	31
4.5	Serial Port.....	31
4.6	Video Extension Slot	31
5	OPERATING TEMPERATURE RANGES	32

List of Figures

Figure 1	SB-xAM Block Diagram	9
Figure 2	SB-xAM Top Components	12
Figure 3	SB-xAM Bottom Components (as seen from top).....	12
Figure 4	Power Supply Polarity	16
Figure 5	P3, P4 Matching Plug	16
Figure 6	P6A and P6B Pin Numeration	17
Figure 7	P6B and P7B Pin Numeration	18
Figure 8	P8 Pin Numeration	18
Figure 9	P27 Matching Plug	26
Figure 10	P28, P29, P30, P31, P32 Matching Plug	27
Figure 11	U1 and U2 Pin Numeration	30

List of Tables

Table 1	SB-xAM features	9
Table 2	Electrical, Mechanical and Environmental Specifications	10
Table 3	SB-xAM configuration options	11
Table 4	User Accessible Components Listing, Top Side	13
Table 5	User Accessible Components Listing, Bottom Side	14
Table 6	Signal Type Definition	14
Table 7	USB VBUS Supply Options	15
Table 8	PCI Slot VIO Options	15
Table 9	J2 Pinout	16
Table 10	P3 Pinout (Line Input 2)	16
Table 11	P4 Pinout (Line Out 2)	16
Table 12	P5 Pinout (CRT)	17
Table 13	P5 Pinout (Serial)	17
Table 14	P6 and P7 Pinout (LAN)	17
Table 15	P6 and P7 Pinout (USB)	18
Table 16	P8 Pinout (SATA)	18
Table 17	P9 Pinout (LVDS)	18
Table 18	P11 Pinout (LCD 24 bit)	19
Table 19	P12 Pinout (LCD 18 bit)	20
Table 20	P13 Pinout (PCIE Slot)	21
Table 21	P15 Pinout (PCI Slot)	21
Table 22	P16 Pinout (SDVO, HDA)	22
Table 23	P25 Pinout (IDE)	24
Table 24	P26 Pinout (AUX)	25
Table 25	P27 Pinout (S/PDIF Coax)	26
Table 26	P28 Pinout (Front)	26
Table 27	P29 Pinout (Line Input 1)	27
Table 28	P30 Pinout (Center/LFE)	27
Table 29	P31 Pinout (Surround)	27
Table 30	P32 Pinout (Microphone Input 1)	28
Table 31	P33 Pinout (LVDS FPC)	28
Table 32	P34, P35 Pinout (PCIE Mini)	29
Table 33	U1 and U2 Pinout (USB)	30

1 INTRODUCTION

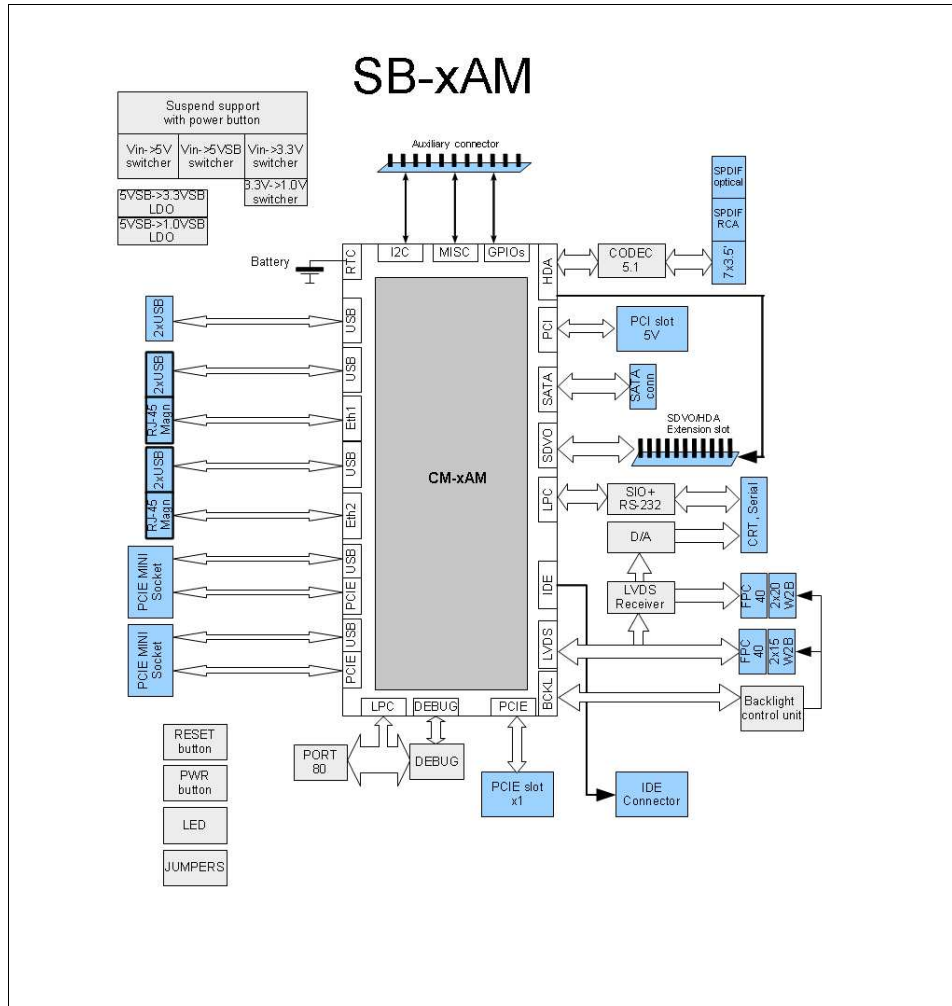
1.1 About This Document

This document is part of a set of reference documents providing information necessary to operate and program CompuLab's SB-xAM Evaluation Platform for use with the CM-xAM Embedded PC Module and found in the Developer section at the CompuLab Web site <http://www.compulab.co.il>.

2 OVERVIEW

2.1 Block Diagram

Figure 1 SB-xAM Block Diagram



2.2 SB-xAM Features

Table 1 SB-xAM features

Feature	Description
Display interfaces	<ul style="list-style-type: none"> • LVDS with 4-pair (and clock) modes support • Parallel RGB interface • CRT interface • DVI by means of EB-DVI SDVO extension module
Network interfaces	Up to 2 x 1000Base-T, activity LED's

USB	<ul style="list-style-type: none"> • 6 external USB1.1 / USB2.0 ports • 2 x USB2.0 ports routed to the PCIE Mini sockets
Bus interfaces	<ul style="list-style-type: none"> • PCI Express slot • 2 x PCI Express Mini sockets • PCI slot: 32-bit, 33MHz, Rev 2.3, 3.3V levels, 5V tolerance
Audio	Intel High Definition Audio CODEC, 5.1 channel. Optical and coaxial S/PDIF outputs. 7 x 3.5mm audio jack outputs/inputs
External Storage	<ul style="list-style-type: none"> • Parallel ATA (According to configuration of the CM-xAM module installed) • Serial ATA port
General purpose I/O	100 mil header
Module interface	COM Express

Table 2 Electrical, Mechanical and Environmental Specifications

Supply Voltage	12.0 VDC
Power consumption	150mA @ 12.0VDC (in addition to the CM-xAM consumption)
Dimensions	185mm x 190mm x 36mm
Weight	250g
MTBF	> 100,000 hours
Operation temp. (case)	0 to 70 °C (Commercial)
Storage temperature	-40 to 85 °C
Relative humidity	5% to 95% (storage) 10% to 90% (operation)
Shock	50G / 20 ms
Vibration	20G / 0–600 Hz
Module connector insertion/ removal	20 cycles

2.3 SB-xAM Part Number Legend

SB-xAM part number format is presented below:

SB-xAM-Lx-A-Ex-Tx

This part number format represents the SB-xAM configuration options available, listed in the following table:

Table 3 SB-xAM configuration options

Feature	Options	Part Number Code
RGB interface: Parallel - for LCD panels Analog - for VGA monitors	(none)	-
	Parallel	L1
	Analog + parallel	L2
5.1 channel audio	No	-
	Yes	A
Ethernet (resource tradeoff, see notes)	(none)	-
	One port	E1
	Two ports	E2
Temperature range	Commercial	-
	Extended	TE
	Industrial	TI

Notes:

Ethernet ports are implemented on the module rather than on the baseboard. The number of Ethernet ports should be specified in baseboard selection for proper routing of resources. It must match this of the module. Ethernet ports share resources with other functions; therefore Ethernet ports should not be assembled if alternative shared resources are required:

- First LAN port is shared with first PCI Express socket
- Second LAN port is shared second PCI Express socket and with IDE connector

3 INTERFACES AND CONTROLS

3.1 Components Locations

Figure 2 SB-xAM Top Components

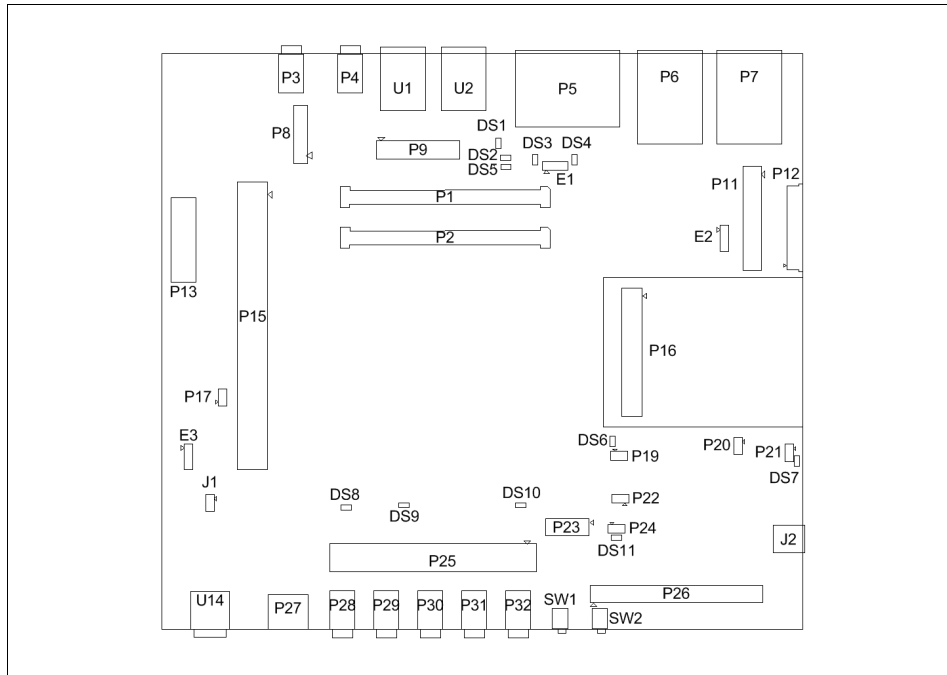
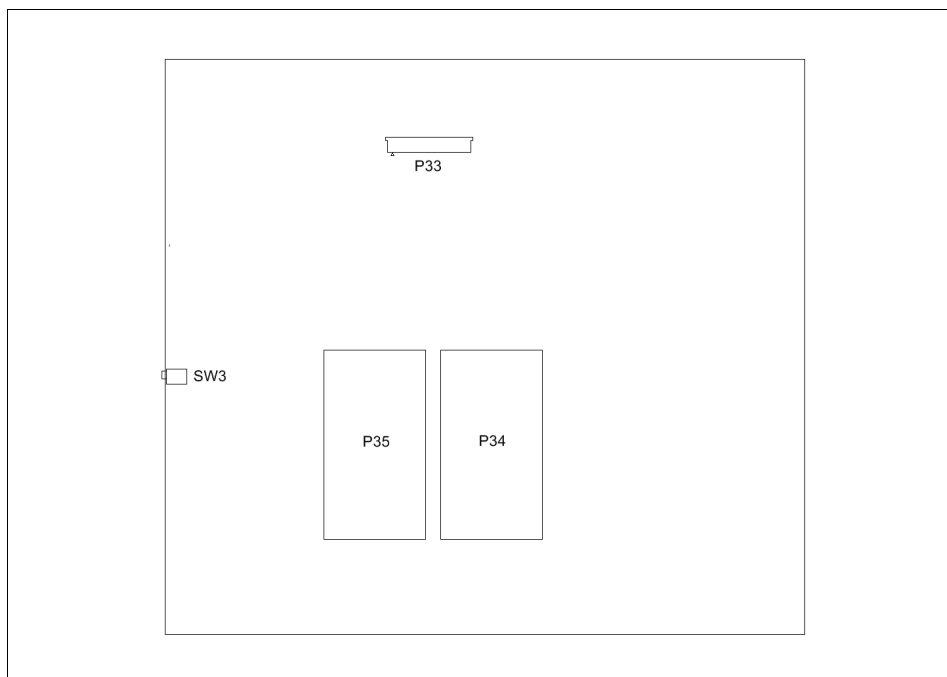


Figure 3 SB-xAM Bottom Components (as seen from top)



3.2 Components Listing

Table 4 User Accessible Components Listing, Top Side

Reference	Type	Description
DS1	LED, green	LVDS power enable indicator
DS2	LED, red	+V3.3SBY indicator
DS3	LED	Not assembled
DS4	LED	Not assembled
DS5	LED, green	SATA activity indicator
DS6	LED, green	+V5 indicator
DS7	LED, green	+V3.3 indicator
DS8	LED, green	Hard drive activity indicator
DS9	LED, green	WLAN activity indicator (device plugged into P35)
DS10	LED, green	WLAN activity indicator (device plugged into P34)
DS11	LED, red	+V5SBY indicator
E1	Header, 3-pin	Not assembled
E2	Header, 3-pin	USB supply jumper
E3	Header, 3-pin	PCI slot VIO jumper
J1	Header, 2-pin	CMOS settings and RTC reset header
J2	Power jack	12V DC power input
P1, P2	Board-to-board	COM Express module connectors
P3	3.5mm audio jack	Line input 2
P4	3.5mm audio jack	Line output 2
P5	Stacked DB-9 / DB-15	CRT output, serial port connectors
P6	Stacked RJ-45 / USBx2	LAN1, USB2, USB3 sockets
P7	Stacked RJ-45 / USBx2	LAN2, USB0, USB1 sockets
P8	SATA signal	SATA interface connector (signal only)
P9	Wire-to-board	LVDS interface connector
P11	Wire-to-board	Parallel LCD (24 bit) connector
P12	Flat PC	Parallel LCD (18 bit) connector
P13	Edge slot	PCI Express slot
P15	Edge slot	PCI slot
P16	Board-to-board	SDVO extension slot
P17	Header, 2-pin	PCI M66EN control
P19	Header, 2-pin	+5V current measurement header
P20	Header, 2-pin	Not assembled
P21	Header, 2-pin	+V3.3 current measurement header
P22	Header, 2-pin	Not assembled
P23	Header, 10-pin	Not assembled
P24	Header, 2-pin	+5VSBY current measurement header
P25	Header, 40-pin	IDE interface connector
P26	Header, 40-pin	Auxiliary signals connector
P27	RCA socket	S/PDIF coaxial output
P28	3.5mm audio jack	Front channels output
P29	3.5mm audio jack	Line input 1
P30	3.5mm audio jack	Center/LFE output
P31	3.5mm audio jack	Surround output
P32	3.5mm audio jack	Microphone input 1
SW1	Push button	RESET switch
SW2	Push button	POWER switch
U1	Stacked USB conn.	USB6, USB7 sockets (not assembled)
U2	Stacked USB conn.	USB4, USB5 sockets
U14	Optical transmitter	S/PDIF optical output

Table 5 User Accessible Components Listing, Bottom Side

Reference	Type	Description
P33	Flat PC	LVDS interface connector
P34	PCIE mini socket	PCIE mini socket
P35	PCIE mini socket	PCIE mini socket
SW3	Push button	Not assembled

3.3 Signal type definition

Table 6 Signal Type Definition

Type	Name	Description
I	Digital Input	CMOS Input pin
O	Digital Output	CMOS Output pin
I/O	Digital Input/Output	CMOS Multiplexed input and output pin to and from SB-xAM
OD	Open Drain	CMOS Open drain output pin, possibly with integrated pull-up
I/OD	Input/Open Drain	CMOS Multiplexed input and open drain output pin to and from SB-xAM , possibly with integrated pull-up
IDIF	Differential (Input)	
ODIF	Differential (Output)	
DIFF	Differential (Bidir)	

3.4 Interfaces and Controls Description

The SB-xAM uses the attached CM-xAM module to implement most of the provided functions. For these functions, the SB-xAM routes the signals from the CM-xAM's miniature connectors to the standard connectors. Each function's description is therefore provided in the CM-xAM Reference Guide. The section below describes only the external interface connectors and other SB-xAM controls.

3.4.1 DS1, LVDS Power Enable Indicator

This green LED indicates the power on the LVDS interface is enabled by the CM-xAM.

3.4.2 DS2, +V3.3SBY Indicator

This red LED indicates the +V3.3SBY voltage is present. This voltage should be always present when 12V power is connected to the SB-xAM.

3.4.3 DS5, SATA Activity Indicator

This red LED indicates the SATA drive is being accessed by the system.

3.4.4 DS6, +V5 Indicator

This green LED indicates the +V5 voltage is present (typically when the system is in the non-sleep state).

3.4.5 DS7, +V3.3 Indicator

This green LED indicates the +V3.3 voltage is present (typically when the system is in the non-sleep state).

3.4.6 DS8, PATA Activity Indicator

This green LED indicates the PATA drive is being accessed by the system.

3.4.7 DS9, WLAN 1 Activity Indicator

This green LED indicates the WiFi module plugged into socket P35 is transmitting or receiving data.

3.4.8 DS10, WLAN 2 Activity Indicator

This green LED indicates the WiFi module plugged into socket P34 is transmitting or receiving data.

3.4.9 DS11, +V5SBY Indicator

This red LED indicates the +V5SBY voltage is present. This voltage should be always present when 12V power is connected to the SB-xAM.

3.4.10 E2, USB Supply

Choose which power rail will be routed to the USB sockets P6, P7, U1, U2 VBUS.

Table 7 USB VBUS Supply Options

Pos.	VBUS
1-2	+V5
2-3	+V5SBY

3.4.11 E3, PCI Slot VIO

Choose which power rail will be routed to the PCI slot VIO supply.

Table 8 PCI Slot VIO Options

Pos.	VIO
1-2	+V5
2-3	+V3.3

3.4.12 J1, CMOS and RTC Reset

In order to reset CMOS and RTC settings on the CM-xAM, first shut down the system and power down the 12V supply. Then short-circuit the J1 for 5-6 seconds. On the next boot default CMOS settings will be applied.

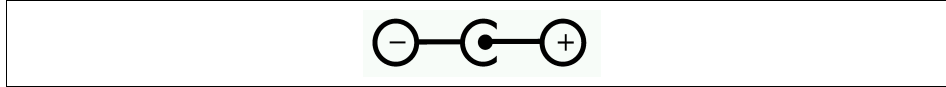
3.4.13 J2, 12V DC Power Input

Connect 12V power supply to this connector.

Note: It's important to use only the certified power adaptor because the CM-xAM module plugged into the SB-xAM receives this 12V supply unmodified.

Table 9 J2 Pinout

Contact	Voltage
Sleeve	GND
Tip	+12V DC

Figure 4 Power Supply Polarity

3.4.14 P1 and P2, COM Express Module Connectors

These connectors pinout is described in the CM-xAM Reference Guide.

3.4.15 P3, Line Input 2

SB-xAM High Definition Audio CODEC's Line Input 2. The function of this socket may be redefined from within the CODEC utility for Windows XP.

This port features a microphone DC reference voltage.

Table 10 P3 Pinout (Line Input 2)

Contact	Signal
Sleeve	GND
Ring	Line Input 2 Right ch.
Tip	Line Input 2 Left ch.

Figure 5 P3, P4 Matching Plug

3.4.16 P4, Line Output 2

SB-xAM High Definition Audio CODEC's Line Output 2. The function of this socket may be redefined from within the CODEC utility for Windows XP.

This port features a microphone DC reference voltage.

Table 11 P4 Pinout (Line Out 2)

Contact	Signal
Sleeve	GND
Ring	Line Output 2 Right ch.
Tip	Line Output 2 Left ch.

3.4.17 P5A, CRT Output

Table 12 P5 Pinout (CRT)

Pin	Signal
1	Red
2	Green
3	Blue
4	N.C.
5	GND
6	GND
7	GND
8	GND
9	N.C.
10	GND
11	N.C.
12	N.C.
13	HSYNC
14	VSYNC
15	N.C.

3.4.18 P5B, Serial Port

Table 13 P5 Pinout (Serial)

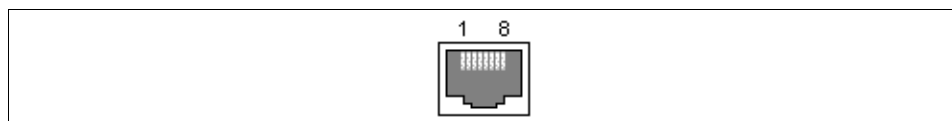
Pin	Signal
1	CD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

3.4.19 P6A and P7A, LAN Interfaces

Table 14 P6 and P7 Pinout (LAN)

Pin	Signal
1	BI_DA+
2	BI_DA-
3	BI_DB+
4	BI_DC+
5	BI_DC-
6	BI_DB-
7	BI_DD+
8	BI_DD-

Figure 6 P6A and P6B Pin Numeration



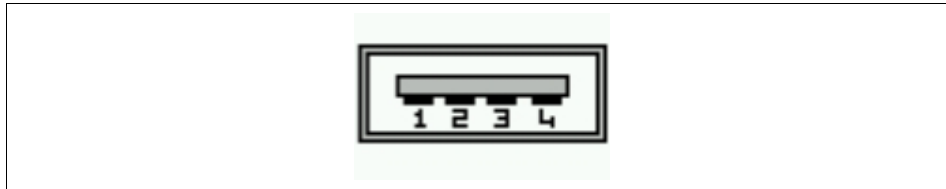
3.4.20 P6B and P7B, USB Interfaces

A stacked dual USB type A socket.

Table 15 P6 and P7 Pinout (USB)

Pin	Signal
1	VBUS
2	USB-
3	USB+
4	GND

Figure 7 P6B and P7B Pin Numeration

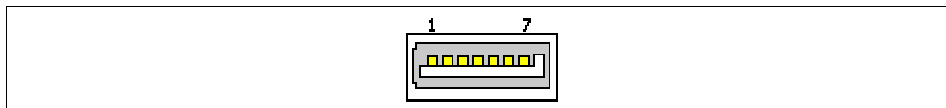


3.4.21 P8, SATA Interface

Table 16 P8 Pinout (SATA)

Pin	Signal
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND

Figure 8 P8 Pin Numeration



3.4.22 P9, LVDS Interface

30-pin (2x15) 1.25mm pitch connector (Hirose DF13A-30DP-1.25V) for LVDS panels.

Table 17 P9 Pinout (LVDS)

Pin	Signal
1	LVDS_BEN
2	NC
3	LVDS_PWR
4	GND
5	LVDS_CKN
6	LVDS_CKP
7	LVDS_PWR
8	GND
9	LVDS_DNO

10	LVDS_DP0
11	LVDS_DN1
12	LVDS_DP1
13	LVDS_DN2
14	LVDS_DP2
15	LVDS_DN3
16	LVDS_DP3
17	LVDS_DDCDATA
18	LVDS_DDCCLK
19	NC
20	NC
21	NC
22	NC
23	NC
24	NC
25	NC
26	NC
27	LVDS_PWR
28	GND
29	NC
30	NC

3.4.23 P11, Parallel LCD (24 bit)

2x20 W2B connector (Hirose DF13A-40DP-1.25V) for TFT panels

Table 18 P11 Pinout (LCD 24 bit)

Pin	Signal
1	+V5
2	+V5
3	GND
4	GND
5	+V3.3
6	+V3.3
7	LVDS_BEN
8	GND
9	LCD_B0
10	LCD_B1
11	LCD_B2
12	LCD_B3
13	LCD_B4
14	LCD_B5
15	LCD_B6
16	LCD_B7
17	LCD_G0
18	LCD_G1
19	LCD_G2
20	LCD_G3
21	LCD_G4
22	LCD_G5
23	LCD_G6
24	LCD_G7
25	LCD_R0
26	LCD_R1
27	LCD_R2
28	LCD_R3
29	LCD_R4
30	LCD_R5

31	LCD_R6
32	LCD_R7
33	GND
34	GND
35	LCD_SCK
36	LCD_VSYNC
37	LCD_DE
38	LCD_HSYNC
39	NC
40	LVDS_EN

3.4.24 P12, Parallel LCD (18 bit)

40-pin FPC connector for TFT panels

Table 19 P12 Pinout (LCD 18 bit)

Pin	Signal
1	NC
2	LCD-VDD-EN
3	GND
4	LCD-R0
5	LCD-R1
6	VCC3
7	LCD-R2
8	LCD-R3
9	GND
10	LCD-R4
11	LCD-R5
12	VCC3
13	LCD-G5
14	LCD-G4
15	GND
16	LCD-G3
17	LCD-G2
18	VCC3
19	LCD-G1
20	LCD-G0
21	VCC3
22	NC
23	NC
24	GND
25	NC
26	LCD-B0
27	VCC3
28	LCD-B1
29	LCD-B2
30	GND
31	LCD-B3
32	LCD-B4
33	GND
34	LCD-B5
35	LCD-DE
36	VCC3
37	LCD-LP
38	LCD-FRM
39	GND

40	LCD-SCK
----	---------

3.4.25 P13, PCI Express slot

PCIE x1 extension slot.

Table 20 P13 Pinout (PCIE Slot)

Pin	Signal	Pin	Signal
A1	PRSNT1#	B1	+12V
A2	+12V	B2	+12V
A3	+12V	B3	+12V
A4	GND	B4	GND
A5	TCK (N.C.)	B5	SMCLK (N.C.)
A6	TDI (N.C.)	B6	SMDAT (N.C.)
A7	TDO (N.C.)	B7	GND
A8	TMS (N.C.)	B8	+3.3V
A9	+3.3V	B9	TRST# (N.C.)
A10	+3.3V	B10	3.3VAux
A11	RERST#	B11	WAKE#
A12	GND	B12	RESERVED
A13	REFCLK+	B13	GND
A14	REFCLK-	B14	PETp0
A15	GND	B15	PETn0
A16	PERp0	B16	GND
A17	PERn0	B17	PRSNT2#
A18	GND	B18	GND

3.4.26 P15, PCI slot

A standard PCI slot, 5V type.

Table 21 P15 Pinout (PCI Slot)

Pin	Signal	Pin	Signal
A1	TRST#	B1	-12V
A2	+12V	B2	TCK
A3	TMS	B3	GND
A4	TDI	B4	TDO
A5	+5V	B5	+5V
A6	INTA#	B6	+5V
A7	INTC#	B7	INTB#
A8	+5V	B8	INTD#
A9	RESERVED	B9	PRSNT#1
A10	VIO	B10	RESERVED
A11	RESERVED	B11	PRSNT#2
A12	-	B12	-
A13	-	B13	-
A14	3.3VAux	B14	RESERVED
A15	RST#	B15	GND
A16	VIO	B16	CLK
A17	GNT	B17	GND
A18	GND	B18	REQ#
A19	PME#	B19	VIO
A20	AD30	B20	AD31
A21	+3.3V	B21	AD29
A22	AD28	B22	GND
A23	AD26	B23	AD27

A24	GND	B24	AD25
A25	AD24	B25	+3.3V
A26	IDSEL	B26	C/BE#3
A27	+3.3V	B27	AD23
A28	AD22	B28	GND
A29	AD20	B29	AD21
A30	GND	B30	AD19
A31	AD18	B31	+3.3V
A32	AD16	B32	AD17
A33	+3.3V	B33	C/BE#2
A34	FRAME#	B34	GND
A35	GND	B35	IRDY#
A36	TRDY#	B36	+3.3V
A37	GND	B37	DEVSEL#
A38	STOP#	B38	GND
A39	+3.3V	B39	LOCK#
A40	SDONE	B40	PERR#
A41	SBO#	B41	+3.3V
A42	GND	B42	SERR#
A43	PAR	B43	+3.3V
A44	AD15	B44	C/BE#1
A45	+3.3V	B45	AD14
A46	AD13	B46	GND
A47	AD11	B47	AD12
A48	GND	B48	AD10
A49	AD9	B49	M66EN
A50	GND	B50	5V key
A51	GND	B51	5V key
A52	C/BE#0	B52	AD8
A53	+3.3V	B53	AD7
A54	AD6	B54	+3.3V
A55	AD4	B55	AD5
A56	GND	B56	AD3
A57	AD2	B57	GND
A58	AD0	B58	AD1
A59	VIO	B59	VIO
A60	REQ64#	B60	ACK64#
A61	+5V	B61	+5V
A62	+5V	B62	+5V

3.4.27 P16, SDVO/HDA Extension

Video/audio extension I/O connector providing support for a wide range of extensions such as DVI, HDMI, VGA and others.

Table 22 P16 Pinout (SDVO, HDA)

Pin	Signal
1	GND
2	GND
3	SDVO_RED
4	GND
5	SDVO_RED#
6	SDVO_TVCLKIN
7	GND
8	SDVO_TVCLKIN#
9	GND
10	GND

11	SDVO_GREEN
12	GND
13	SDVO_GREEN#
14	SDVO_INT
15	GND
16	SDVO_INT#
17	GND
18	GND
19	SDVO_BLUE
20	GND
21	SDVO_BLUE#
22	SDVO_STALL
23	GND
24	SDVO_STALL#
25	GND
26	GND
27	SDVO_CLK
28	GND
29	SDVO_CLK#
30	RESET#
31	GND
32	GND
33	GND
34	GND
35	SDVO_CTRLCLK*
36	NC
37	GND
38	NC
39	SDVO_CTRLDATA*
40	NC
41	GND
42	NC
43	HDA_BITCLK
44	NC
45	GND
46	NC
47	HDA_RST#
48	+5V
49	HDA_SDATAIN
50	+5V
51	GND
52	+5V
53	HDA_SDATAOUT
54	+5V
55	HDA_SYNC
56	+5V
57	GND
58	+5V
59	NC
60	NC
61	+V5SBY
62	NC
63	+V5SBY
64	+V3.3SBY
65	NC
66	+V3.3SBY
67	NC
68	NC

69	NC
70	NC
71	+V3.3
72	+V3.3
73	+V3.3
74	+V3.3
75	+V3.3
76	+V3.3
77	+V3.3
78	+V3.3
79	+V3.3
80	+V3.3

3.4.28 P17, PCI M66EN

2-pin 100 mil header. Forces 33MHz mode when shorted.

3.4.29 P19, +V5 Current Measurement

2-pin 100 mil header. Should be normally shorted. Current flowing on the +V5 rail may be measured by placing voltmeter probes over P19, when jumper removed. The measurement result is then calculated in the following way:

$$I_{+V5} = V_{P19} / 0.018$$

3.4.30 P21, +V3.3 Current Measurement

2-pin 100 mil header. Should be normally shorted. Current flowing on the +V3.3 rail may be measured by placing voltmeter probes over P21, when jumper removed. The measurement result is then calculated in the following way:

$$I_{+V3.3} = V_{P21} / 0.018$$

3.4.31 P24, +V5SBY Current Measurement

2-pin 100 mil header. Should be normally shorted. Current flowing on the +V5SBY rail may be measured by placing voltmeter probes over P24, when jumper removed. The measurement result is then calculated in the following way:

$$I_{+V5SBY} = V_{P24} / 0.018$$

3.4.32 P25, IDE Interface

2x20-pin 100 mil IDE header. Normally assembled, but not routed to the CM-xAM interface connectors because of the signals sharing with the second LAN interface. Routing may be altered manually if IDE functionality required and appropriate CM-xAM module is available.

Table 23 P25 Pinout (IDE)

Pin	Signal
1	IDE_RST#
2	GND
3	PDD7
4	PDD8

5	PDD6
6	PDD9
7	PDD5
8	PDD10
9	PDD4
10	PDD11
11	PDD3
12	PDD12
13	PDD2
14	PDD13
15	PDD1
16	PDD14
17	PDD0
18	PDD15
19	GND
20	-
21	PDREQ
22	GND
23	PDIOW#
24	GND
25	PDIOR#
26	GND
27	PIORDY
28	GND
29	PDDACK#
30	GND
31	IDE_IRQ14
32	-
33	PDA1
34	P66DET
35	PDA0
36	PDA2
37	PDCS1#
38	PDCS3#
39	IDE_LED#
40	GND

3.4.33 P26, Auxiliary Signals

Table 24 P26 Pinout (AUX)

Pin	Signal
1	GPIO1
2	GND
3	GND
4	GPIO6
5	GPIO2
6	GPIO8
7	N.C.
8	GND
9	N.C.
10	GPIO9
11	N.C.
12	+V5
13	GPIO_SUS0
14	N.C.
15	GPIO_SUS1
16	N.C.

17	GPIO_SUS3
18	N.C.
19	GND
20	N.C.
21	SMB_DATA
22	+V3.3
23	SMB_CLK
24	LPCF_GPIO (Debug)
25	N.C.
26	GND
27	HDA_SPKR
28	PWRBTN#
29	N.C.
30	GND
31	N.C.
32	N.C.
33	GPIO6
34	WDI (Debug)
35	N.C.
36	N.C.
37	RST_IN#
38	WD_RESET# (Debug)
39	GND
40	RESET#

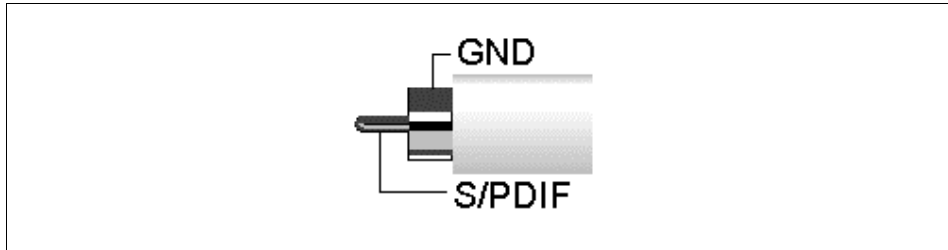
3.4.34 P27, S/PDIF (Coaxial)

A standard RCA port connector.

Table 25 P27 Pinout (S/PDIF Coax)

Contact	Signal
Sleeve	GND
Tip	S/PDIF Output

Figure 9 P27 Matching Plug



3.4.35 P28, 5.1 Front Output

SB-xAM High Definition Audio CODEC’s 5.1 front channels output. The function of this socket may be redefined from within the CODEC utility for Windows XP.

Table 26 P28 Pinout (Front)

Contact	Signal
Sleeve	GND
Ring	Front output right ch.
Tip	Front output left ch.

Figure 10 P28, P29, P30, P31, P32 Matching Plug



3.4.36 P29, Line Input 1

SB-xAM High Definition Audio CODEC's line input 1. The function of this socket may be redefined from within the CODEC utility for Windows XP.

Table 27 P29 Pinout (Line Input 1)

Contact	Signal
Sleeve	GND
Ring	Line Input 1 Right ch.
Tip	Line Input 1 Left ch.

3.4.37 P30, Center/LFE Output

SB-xAM High Definition Audio CODEC's 5.1 center/LFE output. The function of this socket may be redefined from within the CODEC utility for Windows XP.

Table 28 P30 Pinout (Center/LFE)

Contact	Signal
Sleeve	GND
Ring	LFE output
Tip	Center output

3.4.38 P31, Surround Output

SB-xAM High Definition Audio CODEC's 5.1 surround channels output. The function of this socket may be redefined from within the CODEC utility for Windows XP.

Table 29 P31 Pinout (Surround)

Contact	Signal
Sleeve	GND
Ring	Surround output right ch.
Tip	Surround output left ch.

3.4.39 P32, Microphone Input 1

SB-xAM High Definition Audio CODEC's microphone input 1. The function of this socket may be redefined from within the CODEC utility for Windows XP.

This port features a microphone DC reference voltage.

Table 30 P32 Pinout (Microphone Input 1)

Contact	Signal
Sleeve	GND
Ring	Microphone input 1 right ch.
Tip	Microphone input 1 left ch.

3.4.40 P33, LVDS Interface (FPC)

40-pin FPC connector for TFT panels

Table 31 P33 Pinout (LVDS FPC)

Pin	Signal
1	+V3.3
2	+V3.3
3	+V3.3
4	GND
5	GND
6	GND
7	LVDS_DP0
8	LVDS_DN0
9	GND
10	LVDS_DP1
11	LVDS_DN1
12	GND
13	LVDS_DP2
14	LVDS_DN2
15	GND
16	LVDS_DP3
17	LVDS_DN3
18	GND
19	LVDS_CKP
20	LVDS_CKN
21	GND
22	LVDS_EN
23	LVDS_BEN
24	GND
25	N.C.
26	N.C.
27	GND
28	LVDS_DDCCLK
29	LVDS_DDCDATA
30	GND
31	LVDS_BCTL
32	GND
33	N.C.
34	N.C.
35	N.C.
36	N.C.
37	N.C.
38	N.C.
39	N.C.
40	N.C.

3.4.41 P34 and P35, PCIE Mini

P34 is routed to the COM Express PCIE2. P35 is routed to PCIE1.

Table 32 P34, P35 Pinout (PCIE Mini)

Pin	Signal
1	PCIE_WAKE#
2	+V3.3
3	N.C.
4	GND
5	N.C.
6	+V1.5PCIE
7	PCIE_SKT1_CKENA#
8	N.C.
9	GND
10	N.C.
11	PCIE_SKT1_CLK_N
12	N.C.
13	PCIE_SKT1_CLK_P
14	N.C.
15	GND
16	N.C.
17	N.C.
18	GND
19	N.C.
20	W1_DISABLE#
21	GND
22	W1_PERST#
23	PCIE_RXN3_OUT
24	+V3.3SBY
25	PCIE_RXP3_OUT
26	GND
27	GND
28	+V1.5PCIE
29	GND
30	SMB_CLK
31	PCIE_TXN3_OUT
32	SMB_DATA
33	PCIE_TXP3_OUT
34	GND
35	GND
36	USB_PN6_SKT1
37	N.C.
38	USB_PP6_SKT1
39	N.C.
40	GND
41	N.C.
42	N.C.
43	N.C.
44	LED_WLAN1#
45	N.C.
46	N.C.
47	N.C.
48	+V1.5PCIE
49	N.C.
50	GND
51	N.C.
52	+V3.3

3.4.42 SW1, Reset Button

Front-panel reset switch.

3.4.43 SW2, Power Button

An ACPI power button. Press to signal power event to ACPI, press and hold 5 seconds to force power-off.

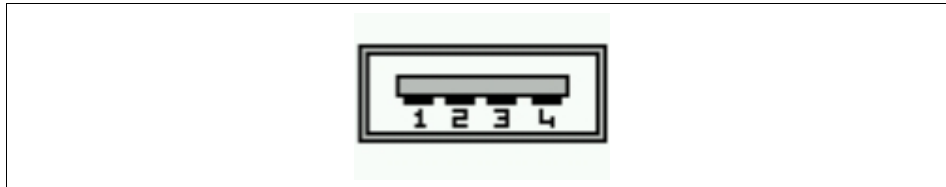
3.4.44 U1 and U2, USB4, USB5, USB6 and USB7

Stacked dual USB type A sockets. U1 not assembled by default because USB6 and USB7 are routed to PCIE Mini sockets. Manual re-routing is possible.

Table 33 U1 and U2 Pinout (USB)

Pin	Signal
1	VBUS
2	USB-
3	USB+
4	GND

Figure 11 U1 and U2 Pin Numeration



3.4.45 U14, S/PDIF Optical

Standard TOSLINK optical cable socket.

4 FUNCTIONS IMPLEMENTED ON THE SB-XAM

Most of the functions are implemented on the attached CM-xAM module, while the SB-xAM board provides related connectors or headers. Several additional functions are implemented on the SB-xAM itself and are described in this section.

4.1 Audio Codec

The SB-xAM implements an on-board 5.1 audio using the Realtek ALC662 chip.

The codec has seven configurable I/O ports and one SPDIF output provided through RCA and optical connectors.

The SB-xAM's audio CODEC connects to the CM-xAM chipset's HDA channel 0 (SDATAIN_0) output, while the interface's channel 1 is routed to the SDVO connector. Operating systems provide support for switching between two channels (CODEC0 and CODEC1).

4.2 LCD Power Switch

SB-xAM contains power switch for proper power sequencing of the LCD display. It is controller by LVDS_EN generated by CM-xAM onboard graphics controller.

4.3 Parallel RGB

The SB-xAM implements LVDS-to-parallel RGB using the 24-bit LVDS receiver.

4.4 Analog RGB

The SB-xAM implements on-board analog RGB (CRT) using the FMS3818 video DAC parallel RGB to CRT converter.

4.5 Serial Port

Serial port is implemented on the SB-xAM using the Fintek F71808E Super I/O chip and a RS-232 driver. Default SIO index/data port address is 0x2E/0x2F.

4.6 Video Extension Slot

The SB-xAM implements SDVO interface for external video devices on connector P16.

The EB-DVI extension board provides such functionality for DVI interface. See <http://www.compulab.co.il/iam/html/iam-developer.py> for more information and available extensions.

5 OPERATING TEMPERATURE RANGES

The SB-xAM is available with three options of operating temperature range:

Commercial	0° to 70° C
Extended	-20° to 70° C
Industrial	-40° to 85° C

The cards' manufacturing and certification method for each option is explained in the "Operating Temperature Ranges" section of the CM-xAM Reference Guide.

The mating CM-xAM module should be ordered for the same as or better temperature range as of the SB-xAM. For example, there is no benefit in using a SB-xAM manufactured for the industrial temperature range with a CM-xAM manufactured for the commercial temperature range. Such a combination is practically limited to the commercial temperature range.